

## CS 330 Homework 3-A

- Convert the following fractional binary values to decimal.
  - 0.11
  - 101.011
  - 10 0000 0000.0000 0000 01
  - 1111 1111.1111 1111
- Convert the following fractional decimal values to binary values.
  - 0.25
  - 8.125
  - 0.65625
  - 0.2
  - 1.01
  - 15.15
- Normalize the following fractional binary numbers. Give your answer in scientific notation, expressing the mantissas in binary and the exponents in decimal.
  - 10.0
  - 0.1000 0111
  - 1101 0110.01
  - 0.0001 1
- Show how the following binary numbers would be represented in IEEE 754 single precision. In each number, mantissas are given in binary, while exponents are given in decimal. Give your answers in hex.
  - $1.1 \cdot 2^0$
  - $-1.0100\ 1100\ 0010 \cdot 2^{15}$
  - $1.0100\ 1100\ 0010 \cdot 2^{-15}$
  - $1.1111\ 0000\ 1 \cdot 2^{126}$
  - $-1.1111\ 0000\ 1 \cdot 2^{-127}$
  - $0.0\ E \cdot 2^0$
- Convert the following IEEE 754 single precision bit patterns to decimal. Give your answers in either regular positional notation or normalized scientific notation.
  - 0x 3FC0 0000

- (b) 0x BFC0 0000
- (c) 0x COE0 0000
- (d) 0x 7010 2000
- (e) 0x 7F80 0000
- (f) 0x 0000 0000
- (g) 0x FFFF FFFF

6. Convert the following decimal values to IEEE 754 single precision (32 bits). When converting the fractional part to binary, you may stop when the total number of bits in the significand is 12. Give your answers in hex.

- (a) 48.0
- (b) -0.03125
- (c) 11.11
- (d) 1000000.0
- (e) -8.0
- (f) -0.125